

VII.—*Undescribed Species of African Crane-flies in the Collection of the British Museum (Natural History):* Tipulidæ, Diptera.—Part II. Subfamily Tipulinæ. By CHARLES P. ALEXANDER, Ph.D., Urbana, Illinois, U.S.A.

THE present paper is a continuation of the first part under this title, dealing with the Limnobiine forms in the collection of the British Museum. In this instalment the species of the Tipuline genus *Nephrotoma* (*Pachyrrhina*) are considered. The holotypes of all the species are contained in the collection of the British Museum (Natural History).

Nephrotoma chatopyga, sp. n.

Antennæ of the male elongated, flagellum dark brown; head orange, the occipital mark very indistinct; mesonotal præscutum shiny black, the humeral angles yellowish; scutum and scutellum black; postnotum largely yellow; pleura black with a large yellow area before the halteres; wings strongly suffused with yellowish; apices of cells R_5 and M_1 with macrotrichiæ; abdomen black, segments two to five dull reddish basally; eighth sternite of the male hypopygium rather extensive, the median area clothed with conspicuous curved bristles.

Male.—Length about 13 mm.; wing 15.5 mm.

Frontal prolongation of head yellow, the dorso-median area dark brown; palpi dark brownish black. Antennæ with the first scapal segment orange; second segment orange-brown; flagellum dark brown; antennæ elongated, if bent backward extending slightly beyond the base of the abdomen. Head orange; occipital mark very indistinct, not shiny, pale brown.

Pronotum black, behind narrowly paler. Mesonotal præscutum shiny black with only the humeral angles obscure yellow; scutum and scutellum shiny black; postnotum with the median sclerite light yellow, the caudal margin narrowly infuscated; lateral sclerites yellow, the dorsal-posterior third brownish black. Pleura black, the dorso-pleural membrane obscure yellow; a large, light yellow area before the halteres, including the mesepimeron and the lateral sclerites of the postnotum as described above. Sternum black. Halteres brown, the base of the stem and the apex of the knob yellow. Legs with the coxæ black; trochanters conspicuously reddish yellow, the remainder of

the legs broken. Wings with a strong brownish-yellow tinge, cells *C* and *Sc* more saturated; stigma oval, dark brown; oblitative areas before the stigma and across the inner end of cell 1st M_2 ; veins dark brown; apices of cells R_5 and M_1 with macrotrichiae. Venation: *Rs* nearly straight, a little shorter than R_{2+3} ; cell M_1 narrowly sessile; fusion of *M* and Cu_1 about equal to that section of *M* beyond it.

Abdominal segment one black; two to five dull red, the caudal and lateral margins broadly black; six to nine entirely black; outer pleural appendage obscure yellow. Ninth tergite entirely black, with a deep, U-shaped median notch, the lobes thus formed oblique, terminating in a large apical point, the margin provided with numerous blackened denticles. Outer pleural appendage long and narrow, gradually tapering to the subacute apex. Penis-guard straight, moderately broad at the base, subtended on either side by a slightly longer, slender, flattened apophyse. Eighth sternite rather extensive, the apex broadly emarginate, the caudal angles conspicuously fringed with long, coarse, curved bristles that are directed proximad, the base of the notch with more delicate, long, yellowish bristles.

Hab. British East Africa.

Holotype, ♂, Gelegele River, June 1913 (*A. O. Luckman*).

Presented by the Imperial Bureau of Entomology, 1917.

33.

Type in the collection of the British Museum (Natural History).

Nephrotoma albonigra, sp. n.

General coloration black; head deep orange; humeral angles of præscutum, cephalic portion of postnotum, and a large area on the pleura before the halteres yellowish; halteres uniformly dark brown; wings brown, the costal region more suffused; macrotrichiae in the apex of the cell R_5 generally numerous; abdomen entirely black, the basal half of the segments more blue-black, the caudal half velvety black; male hypopygium with the eighth sternite entire, the margin not conspicuously hairy.

Male.—Length 12.4 mm.; wing 13 mm.; antennae about 7 mm.

Female.—Length about 16 mm.; wing 13.8 mm.

Frontal prolongation of head short, light yellow, the nasus and a spot surrounding its base dark brown; palpi black, the base of the first segment paler. Antennae rather long,

in the male sex, if bent backward, extending to beyond the base of the third abdominal segment; first scapal segment obscure yellowish brown; remainder of the antennæ black; flagellar segments densely covered with a short, erect, white pubescence. Head deep orange; a rich reddish-brown spot adjoining the inner margin of the eye; occipital mark indistinct.

Pronotum velvety black, the lateral portions of the scutellum more yellowish; in the female, the median area of the scutum is broadly orange. Mesonotum shiny blue-black, only the extreme humeral angles of the præscutum obscure yellow; median sclerite of the postnotum with only the extreme cephalic (dorsal) margin indistinctly brighter in the male, this sclerite largely orange-yellow in the female; lateral sclerites of the postnotum with an extensive yellowish-white area, which also includes the mesepimera of the pleura. Pleura black with the yellowish area before the halteres just described; dorso-pleural membrane obscure yellow. Halteres black. Legs with the coxæ and trochanters black; remainder of the legs black, the bases of the femora indistinctly pale brownish. Wings with a strong brownish tinge, cell *C* more saturated, cell *Sc* dark brown; stigma oval, dark brown, the proximal end sparsely hairy, there being about fifteen macrotrichiae, all lying proximad of *r*; a brown seam along the deflection of R_{4+5} and *r-m*; wing-apex slightly darkened; a brown seam occupying the space between *Cu* and the abortive vein immediately behind it; veins brownish black; usually a large number (30-35) of macrotrichiae in the end of cell R_5 , this number rarely reduced. Venation: *Rs* rather short, about as long as the deflection of R_{4+5} and *r-m* taken together; cell M_1 short-petiolate or narrowly sessile; fusion of M_3 and Cu_1 slight, about equal to *M* beyond this fusion.

Abdomen black, the caudal half of the segments velvety black, the basal half more blue-black; appendages of the male hypopygium dull yellow. Male hypopygium with the ninth tergite with the median area produced caudad and with a deep, U-shaped, median notch, the caudal margin of the lobes thus formed more transverse than in *N. chatopyga*, the lateral angles conspicuous, the proximal margins with numerous spinous tubercles. Pleural appendages small, the outer appendage narrowed at the base, thence suddenly enlarged and tapering rapidly into the long slender apex; inner pleural appendage flattened, the cephalic margin heavily blackened and with one conspicuous tooth. Ninth

sternite with a deep median notch. Eighth sternite without a median emargination and long bristles as in *N. chaetopyga*. The female has the valves of the ovipositor dark chestnut-brown.

Hab. Uganda.

Holotype, ♂, Western Ankole, altitude 4500–5000 feet, October 10–14, 1911 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1915. 57.

Allotopotype, ♀.

Paratopotype, ♂; *paratypes*, 2 ♀'s, West Shores of Victoria Nyanza, Buddu, altitude 3700 feet, September 19–25, 1911 (*S. A. Neave*); a broken ♀, Northern Buddu, altitude 3800 feet, September 16–18, 1911 (*S. A. Neave*); ♂, Mabira Forest, Chagwe, altitude 3500–3800 feet, July 16–25, 1911 (*S. A. Neave*); ♀, Daro or Durro Forest, Toro, altitude 4000–4500 feet, October 25–29, 1911 (*S. A. Neave*); ♀, Tero Forest, July 9, 1912 (*C. C. Gowdey*).

Type in the collection of the British Museum (Natural History).

The paratype females show more yellow at the humeral angles, this encroaching conspicuously upon the pleural region. With more material, these may be found to represent a distinct species.

Nephrotoma chalybea, sp. n.

General coloration black; head deep orange; humeral angles of præscutum broadly yellow; cephalic half of postnotum and extensive areas on the pleura yellow; postnotum and scutellum clothed with short, conspicuous, black hairs; halteres with the knobs yellow apically; tibiæ conspicuously paler than the femora; wings yellowish brown, the costal margin slightly darker; macrotrichia in the apex of cell R_3 reduced to one or two or lacking; abdomen shiny blue-black, the caudal margins of the segments velvety black; tergites one to four with a conspicuous reddish mark on the sides at the base; male hypopygium with the eighth sternite entire, not conspicuously hairy.

Male.—Length 14.2 mm.; wing 14.6 mm.; antennæ about 6 mm.

Female.—Length 18–18.5 mm.; wing 15.4–15.6 mm.; abdomen alone about 13.8–14 mm.

Frontal prolongation of head yellow, the dorsum and nasus conspicuously liver-coloured; mouth-parts pale flesh-coloured; palpi brown, paler basally. Antennæ moderately

long, less elongate than in *N. albonigra*; first scapal segment obscure orange; second segment light brown; flagellum black, the basal enlargement about one-half the remainder of the segment. Head fiery orange; a brown spot on the vertex adjoining the inner margin of the eye; occipital mark rather small, dark brown.

Prothorax shiny black, indistinctly paler medially. Mesonotal praescutum with the black stripes entirely confluent, except in the female where the interspaces are barely indicated behind; humeral angles light yellow, concolorous with the dorso-pleural membrane; scutum and scutellum shiny black, the median line of the former and the extreme base of the latter obscure yellow; median sclerite of postnotum with the cephalic half light yellow, the caudal half black, the postnotum and scutellum densely and conspicuously clothed with short, dark-coloured hairs; lateral sclerites of postnotum black with a large yellow area in front of the halteres, this also including the mesepimera of the pleura. Pleura black, the dorso-pleural membrane and a large area in front of the halteres as discussed above, light yellow; the margin of the mesosternum between the mid- and hind coxæ likewise light yellow; margin of the mesosternum between the fore and mid coxæ more obscure yellow. Halteres black, the knobs conspicuously light yellow. Legs with the coxæ black, sparsely pruinose; trochanters brown, the fore trochanters more reddish brown; femora black, the bases narrowly and indistinctly paler; tibiæ rather light brown, the tips blackened; tarsi black. Wings with a strong yellowish-brown tinge, the costal cell slightly darker, cell *Sc* dark brown; wing-tip very indistinctly darker; veins dark brownish black; macrotrichiae in the apex of cell R_5 reduced to but one or two, or lacking; stigma more densely hairy than in *N. albonigra*, there being from twenty to twenty-five macrotrichiae proximad of r ; Venation: R_s short, but little longer than the deflection of R_{4+5} ; cell M_1 broadly sessile; fusion of M_3 and Cu_1 slight, about equal to M beyond it.

Abdomen shiny blue-black, the caudal margins of the segments narrowly but conspicuously velvety black; tergites one to four with a conspicuous reddish area on the sides near the base; hypopygium dark, the outer pleural appendage light yellow. In the female, segments eight and nine are rich reddish orange, the valves similar but more blackish basally. Male hypopygium with the ninth tergite extensive, the caudal margin with a conspicuous V-shaped depression,

the point with a median split that extends to the eighth tergite; a small U-shaped median notch with nearly parallel sides, the lateral lobes thus formed covered with abundant blackened setigerous tubercles; viewed from the side, the outermost lobes are seen to bear on their caudal face a slender blackened arm, whose ventral proximal face is serrated. Outer pleural appendage very slender, broadest just beyond the base, tapering to a long point. Gonapophyses flattened, widened distally. Ninth sternite with a nearly square median notch, the median area cephalad of this notch weakly membranaceous. Eighth sternite unarmed.

Hab. Uganda.

Holotype, ♂, Daro or Durro Forest, Toro, altitude 4000–4500 feet, October 25–29, 1911 (*S. A. Neave*).

Allotopotype, ♀.

Paratype, ♀, Mabira Forest, Chagwe, altitude 3500–3800 feet, July 16–25, 1911 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1913. 140, 1915. 57.

Type in the collection of the British Museum (Natural History).

A female from Northern Buddu, altitude 3800 feet, September 16–18, 1911 (*S. A. Neave*), and two females from between the Seziwa River and Kampala, altitude 3500–3750 feet, August 27–31, 1911 (*S. A. Neave*), differ from the types above described in a few respects, but probably belong to this species (labelled *N. chalybea*, variety).

Nephrotoma fumidapicalis, sp. n.

Allied to *N. mossambica*; general coloration orange-yellow; mesonotal præscutum and scutum with a single large shiny black area; postnotum and scutellum provided with numerous short black hairs; legs black, the femoral bases broadly yellowish; wings smoky brown, the apex distinctly darker; abdomen orange-yellow, segments two to five with the caudal and lateral margins broadly black, segments six to nine black.

Male.—Length 11.5–12.5 mm.; wing 12–13 mm.; antennæ about 7.1 mm.

Female.—Length 15–17 mm.; wing 13.3–15 mm.

Frontal prolongation of head yellow, the dorsum slightly more reddish, shiny; nasus tipped with long black bristles; mouth-parts and palpi reddish yellow. Antennæ of the

male elongate, if bent backward extending to the end of the third abdominal segment; distal segments long, the basal enlargement only about one-third the remainder of the segment. Head rich orange without darker markings.

Prothorax orange-yellow. Mesonotal præscutum shiny obscure yellow, the three black stripes entirely confluent, only the humeral region and a small spot behind the out-curved ends of the lateral stripes being of the ground-colour; scutum with the lobes shiny black, confluent with the area on the præscutum, median area of the scutum yellow; scutellum yellowish testaceous; postnotum yellow, the surface of this sclerite and the scutellum densely covered with comparatively short black hairs. Pleura reddish yellow, sparsely variegated with whitish before the stigma and on the mesosternum. Halteres obscure brownish yellow, the stem before the knob slightly infuscated, the knobs usually brighter yellow. Legs with the coxæ and trochanters shiny orange-yellow; femora black, the bases broadly yellowish; tibiæ and tarsi black. Wings with a smoky-brown tinge, most distinct apically in cells R_2 to M_4 ; cell C light brown, Sc darker brown; a brown seam between Cu and the abortive vein immediately behind it; stigma oval, dark brown, the proximal end with about eighteen macrotrichia; veins dark brown; macrotrichia in the apex of cell R_5 variable in number, ranging from few to several. Venation: vein R_2 indistinct, evidently in process of atrophy, with but one or two macrotrichia and these close to r ; R_s nearly as long as the deflection of R_{4+5} plus $r-m$; cell M_1 broadly sessile; fusion of M_3 and Cu_1 longer than M beyond it.

Abdomen orange-yellow, tergites two to five with the caudal margin deep black, the coloration continued for some distance cephalad along the lateral margins of the segments; remainder of the abdomen black excepting the pleural appendages which are pale; in the female, segments two to six are margined caudally and laterally with black; in some specimens of the series, the caudal band is reduced to a large median area, but the lateral stripe persists in all cases. Male hypopygium with the ninth tergite comparatively narrow, the caudal margin but little produced, the two sub-median lobes lying in a shield-shaped caudal depression, separated from one another by a very deep median notch, their proximal angles nearly contiguous, their apices provided with numerous blackened spicules; dorsal surface of the tergite moderately convex. Outer pleural appendage light yellow, long and narrow, broadest just beyond the

narrow base, thence tapering gradually to the narrow apex ; inner pleural appendage a flattened blade, the posterior outer angle near the base with a long, needle-like, blackened spine. Ninth sternite with a broadly rectangular median notch, the base convexly rounded. Eighth sternite with the posterior margin pale, provided with a long, slender, finger-like median lobe that is directed ventrad and caudad and is slightly enlarged distally, covered with a pale, silken, appressed pubescence.

Hab. Nyasaland, Southern Rhodesia.

Holotype, ♂, Mt. Mlanje, Nyasaland, altitude 2500 feet, April 26, 1910 (*S. A. Neave*). No. 1919. 174.

Allotopotype, ♀, April 30, 1910.

Paratopotypes, 2 ♂'s, 3 ♀'s, April 26, 1910 ; 3 ♀'s, April 28, 1910 ; 1 ♀, May 4, 1910 ; 1 ♀, December 28, 1912 (no. 1913. 236) ; 1 ♂, January–February, 1914 (*J. B. Davey*) (no. 1915. 58).

Paratypes, ♂ ♀, Mt. Chirinda, Southern Rhodesia, altitude 3800 feet, June 8, 1911 (*C. F. M. Swynnerton*) (no. 1912. 145).

Type in the collection of the British Museum (Natural History).

The nearest described relative of the present species would seem to be *N. mossambica*, Alexander, a larger fly with the details of coloration distinct, the scutellum and postnotum but sparsely hairy, and with the hypopygium differently constructed.

Nephrotoma fumidapicalis ampla, subsp. n.

Female.—Length 14·3–19 mm. ; wing 13·8–16 mm.

Close to typical *fumidapicalis*, Alexander (Mt. Mlanje, altitude 2500 feet), differing as follows :—

Wings with a strong yellowish tinge, the apex not strongly darkened ; subcostal cell more yellowish ; a dusky cloud along the cord. Postnotum subglabrous. Abdomen orange-yellow, the lateral margins broadly blackened, the first tergite black ; tergites two to five with a blackish triangle at the posterior margin, this not connected with the lateral margins ; apical half of tergite six and all of tergite seven black ; tergite eight yellow ; tergite nine and the ovipositor horn-coloured.

Hab. Nyasaland.

Holotype, ♀, Mt. Mlanje, altitude 6500 feet, May 1, 1910 (*S. A. Neave*). B.M. no. 1919. 174.

Paratopotype, ♀.

Type in the collection of the British Museum (Natural History).

Nephrotoma fuscipennis pronotalis, subsp. n.

Male.—Length 10·5 mm. ; wing 9·8 mm.

Female.—Length 12 mm. ; wing 11 mm.

Close to typical *fuscipennis*, Karsch (Portuguese West Africa), differing as follows :—

General coloration not blue-black, but of an intense coal-black. Occipital mark small but indicated in the type ; no longitudinal black stripe on the frontal prolongation of the head ; nasus black. Antennæ with only the first segment reddish. Pronotum with the dorso-median area fiery orange in both sexes. Mesonotum black, the humeral angles conspicuously obscure yellow. Wings without whitish markings in the cells. Legs with the basal fifth of the fore femora conspicuously yellowish. The third abdominal segment has only the extreme base orange-yellow. The hypopygium is conspicuously orange-yellow, including the appendages. The hypopygium is of the general type of structure of *N. tincta*, et al., the caudal margin of the eighth sternite with a median, flattened, pale lobe.

The allotype female is similar, but has the humeral angles of the præscutum even more broadly yellow ; abdomen with the extreme base of the fourth abdominal segment yellowish on the sides.

Hab. Uganda.

Holotype, ♂, North Ruwenzori, altitude 6000–8500 feet, November 1–2, 1911 (*S. A. Neave*).

Allotype, ♀, Ankole-Toro Border, east of Lake George, altitude 4500 feet, October 20–21, 1911 (*S. A. Neave*).

Paratype, sex? (abdomen broken), Kampala, November 4, 1916 (1262) ; ♂, Kambove, Katanga, altitude 4000–5000 feet, June 11, 1904 (*S. A. Neave*). B.M. no. 1907. 230.

Type in the collection of the British Museum (Natural History).

The paratypical specimens may not belong to this species, as the occipital mark is very much more evident, deep chestnut-brown and shiny, and the second to fourth abdominal segments are almost entirely uniform orange-yellow, somewhat as in *N. tincta* (Walk.).

Nephrotoma fuscipennis triflava, subsp. n.

Male.—Length 11 mm. ; wing 9·8–10·4 mm.

Female.—Length 15·5 mm. ; wing 13·6 mm.

Close to typical *fuscipennis*, Karsch (Portuguese West Africa), differing as follows :—

Second segment of the antenna dark brown ; in the allotype female the entire scape is dark. Occiput with a conspicuous black triangular mark. Mesonotal postnotum light yellow with two large, rounded, black spots. Wings dusky black, the apices indistinctly paler. Abdomen with the first segment black ; second to fourth segments yellow, the apices narrowly black, broadest on the fourth segment ; remainder of the abdomen jet-black with the exception of the slender outer pleural appendages of the male which are obscure yellow.

The female is referred to this species with considerable doubt. The head is largely jet-black, the vertex and part of the front orange-yellow. Lateral margins of the mesonotal præcutum very narrowly light yellow. Bases of the femora more extensively paler. The extreme basal lateral angles of the fifth abdominal segment are indistinctly reddish. The tergite of the genital segment obscure reddish.

Two other specimens in poor condition (Lagari, British East Africa, March 1–May 21, 1900 ; May 26, 1901, *C. S. Betton*) may pertain to this race.

Hab. East Africa.

Holotype, ♂, Ex-German East Africa, Usangu District, altitude 3500–1500 feet, November 29–December 15, 1910 (*S. A. Neave*).

Allotype, ♀, Five to seven miles into the Kenia Forest, near the Luchi River, February 9–10, 1911 (*T. J. Anderson*).

Paratopotype, ♂ ; *paratype*, ♂, Kampala, Uganda, April 1–6, 1919 (*C. C. Gowdey*).

Type in the collection of the British Museum (Natural History).

Nephrotoma quincunx edita, subsp. n.

Male.—Length 11 mm. ; wing 12 mm.

Female.—Length 14 mm. ; wing 12·2 mm.

Close to typical *quincunx* Speiser (East Africa), differing as follows :—

Size smaller. Head with the front and vertex pale orange-yellow with a very large, black, occipital mark, the yellow

pattern ending abruptly opposite the posterior margin of the eye. Frontal prolongation and ventral surface of the head black. The median sclerite of the mesonotal postnotum has at least the anterior two-thirds light yellow. Halteres light brown, the knobs yellow. Femora black with only the bases yellow, those of the fore legs including about one-third of the segment, the hind legs including approximately one-half the segment. Abdomen with segments one and five to nine black, segments two to four and the extreme base of tergite five uniformly orange, immaculate. In the female the ninth segment is orange, the valves of the ovipositor bright horn-colour.

Hab. Uganda.

Holotype, ♂, Mt. Kokanjero, south-west of Elgon, altitude 6400 feet, August 9, 1911 (*S. A. Neave*). B.M. no. 1913. 140.

Allotopotype, ♀.

Paratopotypes, 2 ♂'s, 1 ♀.

Type in the collection of the British Museum (Natural History).

Nephrotoma ochripennis, sp. n.

Antenna with the first scapal segment orange; head orange-yellow, the occipital mark elongate, black; mesonotum yellow, the præscutum with three broad black stripes; pleura spotted with brownish black; halteres with the knobs yellow; wings light yellow, the costal and subcostal cells more saturated; abdomen reddish, with a broad black sub-terminal ring; tergites two to five with a black triangle at the caudal margin.

Male.—Length 11 mm.; wing 12 mm.

Frontal prolongation of the head very short, light yellow, blackish above; palpi dark brown. Antennæ with the first segment orange; second segment reddish brown; flagellum black. Head orange-yellow, clearer yellow anteriorly; occipital mark elongate-triangular, black, very conspicuous.

Pronotum light yellow, the sides with a linear black mark. Mesonotal præscutum yellow with three broad black stripes that are approximated but not confluent behind; lateral stripes bent outward to the margin; scutum with the lobes black, the median area conspicuously light yellow; scutellum brownish testaceous; postnotum clear yellow, the posterior margin narrowly darkened; between the median and lateral sclerites an intense black U-shaped mark. Pleura yellow;

a large dark brown spot on the mesepisternum and a smaller, almost confluent, mark on the mesepimeron beneath the wing-root. Sternum with a large rounded black spot on the sides between the fore and middle coxæ. Halteres light brown, the knobs conspicuously light yellow. Legs with the coxæ reddish, the bases of the fore and hind coxæ blackened; trochanters reddish; femora obscure reddish, the tips broadly dark brown, broadest on the fore legs where they cover about the distal third, narrowest on the hind legs; tibiæ light brown, the tips narrowly dark brown; tarsi dark brown. Wings light ochreous yellow, the costal and subcostal cells brighter; stigma oval, dark brown; wing-apex narrowly darkened; veins dark brown. Venation: *Rs* a little longer than the deflection of R_{4+5} ; cell M_1 broadly sessile; *m-cu* punctiform, inserted just before the fork of *M*.

Abdominal tergites reddish, the lateral margins narrowly blackened; tergite one black medially; tergite two with a small spot near mid-length; caudal margin of segments two to five with a conspicuous triangular black mark; segment six black with only a small, basal, sublateral, reddish area; segments seven and eight black; hypopygium reddish yellow; sternites reddish yellow, segments six to eight largely black. Male hypopygium with the ninth tergite having a narrow median notch, the lateral lobes thus formed very obtusely truncated, the margins provided only with a short pale pubescence; outer pleural appendage rather broad, the apex suddenly narrowed.

Hab. British East Africa.

Holotype, ♂, foot of Kikuyu Escarpment, altitude 7300 feet, March 3, 1911 (*S. A. Neave*). B.M. no. 1912. 70.

Type in the collection of the British Museum (Natural History).

In its general appearance, the yellow-knobbed halteres, and other features, *Nephrotoma ochripennis* bears a considerable resemblance to *N. mossambica*, Alexander (South-eastern Rhodesia), which is a larger species with the apices of the wings pubescent and with the details of coloration different.

Nephrotoma chapini pattersoni, subsp. n.

Male.—Length 11.5 mm.; wing 11.8 mm.

Close to typical *chapini*, Alexander (Belgian Congo), differing as follows:—

Occiput with a brown triangular area. Antennæ rather elongate for an Ethiopian species of this genus. Stripes on

the mesonotal præscutum entirely confluent behind, the ground-colour restricted to yellowish areas at the humeral angles; scutellum dusky, the lateral sclerites darker. Wings with a dusky brown tinge, the costal cell pale brown, the subcostal cell dark brown; veins dark brown. Venation: cell 1st M_2 small; fusion of Cu_1 and M rather extensive, Cu_1 breaking away a short distance before the fork of M . Abdomen with the first segment black; second segment orange-yellow with nearly the distal half black; segment three black with only the basal third obscure orange-yellow; segments four and five reddish yellow, the margins narrowly blackened; segments six to eight black, the hypopygium obscure reddish chestnut; ninth tergite darker laterally. Lateral lobes of the tergite provided with conspicuous black tubercles along the outer margin.

Hab. Gold Coast.

Holotype, ♂, Aburi, 1912–1913 (*W. H. Patterson*).

Paratopotype, ♂, general.

Type in the collection of the British Museum (Natural History).

Nephrotoma leonia, sp. n.

Antennæ with the scape orange; flagellar segments moderately elongated; head orange, the occipital mark small, indistinct; mesonotum yellow, the præscutum with three conspicuous black stripes; scutum almost entirely black; pleura whitish with a very conspicuous black area on the mesepisternum; halteres dark brown; wings greyish, cell Sc brown; macrotrichia in the end of cell R_5 ; abdomen orange, the tergites ringed caudally with black; hypopygium orange.

Male.—Length 10 mm.; wing 10 mm.

Frontal prolongation of the head shiny yellow, nasus distinct; palpi dark brown, paler at the base. Antennæ with the scapal segments orange, the flagellum dark brownish black; flagellar segments only moderately elongated. Head orange; occipital mark small, oval, rather indistinct; vertical tubercle entire.

Pronotum light yellow, the sides scarcely darker. Mesonotal præscutum yellow with three conspicuous black stripes, the lateral stripes strongly outcurved to the dorso-pleural membrane; scutum shiny black, only a small median area immediately behind the suture paler; scutellum brown, the sides black; postnotum pale yellow, the posterior margin

with two large, rounded, black spots; lateral sclerites of the postnotum white, almost surrounded by a U-shaped black mark. Pleura whitish; a very large, mirror-like black spot that covers almost all of the mesepisternum and the cephalic margin of the mesepimeron. Sternum with the sides reddish brown. Halteres dark brown, the extreme tip of the knobs indistinctly pale. Legs with the coxæ pale reddish yellow; trochanters yellow; femora brownish black, the bases obscure yellow, narrowest on the fore legs, broadest on the posterior legs; tibiæ dark brown, passing into black at the tips; tarsi black. Wings greyish, the costal cell concolorous; subcostal cell and stigma brown; wing-apex slightly infumed; veins dark brown; a group of about twenty-five macrotrichia in the end of cell R_5 . Venation: cell M_1 short-petiolate to sessile; fusion of Cu_1 and M before the fork of the latter longer than $r-m$.

Abdomen orange; first tergite black; tergite two with about the apical third black; segment three with about the apical half black; segments four and five with a small median black spot, smaller on the last segment; segments six and seven black, the lateral margins of the former broadly reddish; hypopygium orange. Male hypopygium with the ninth tergite having a deep median notch, the submedian lobes thus formed small, light yellow, covered with a pale pubescence; lateral lobes of the tergite moderately long, the proximal and ventral faces spiculate. Eighth sternite black, margined caudally with reddish yellow, the median area rather deeply notched, the surface covered with long conspicuous yellow bristles.

Hab. West Africa.

Holotype, ♂, Bo, Sierra Leone, April–May, 1910 (*Dr. H. E. Arbuckle*). B.M. no. 1910. 247.

Paratype, ♂, Ikotekpene, Southern Nigeria, May 17, 1910 (*J. J. Simpson*). B.M. no. 1915. 58.

Type in the collection of the British Museum (Natural History).

The paratype has the flagellar segments a little shorter, but shows no other essential differences from the type.

Nephrotoma nigeriensis, sp. n.

Antennæ with the scape obscure reddish; first flagellar segment reddish brown; flagellum black; head obscure orange-brown; mesonotal præscutum yellow, with three black stripes; median stripe paler than the lateral stripes;

pleura yellow, conspicuously spotted with dark brown; halteres brown, the tips of the knobs yellow; femora brownish yellow, the tips dark brown; wings greyish subhyaline; no macrotrichia in cell R_5 ; abdomen orange, the tergites narrowly ringed caudally with black.

Male.—Length 10·8 mm.; wing 10·8–11 mm.

Frontal prolongation of the head pale reddish yellow; palpi brown. Antennae rather long and slender, if bent backward extending approximately to the base of the abdomen; scape obscure reddish; first flagellar segment reddish brown; remaining flagellar segments black. Head obscure orange-brown; occipital area shiny, large but ill-defined; vertical tubercle entire.

Pronotum narrowly obscure yellow medially, the sides dark brown. Mesonotal præscutum yellow with three black stripes, the median stripe much paler than the lateral stripes; scutum yellow with the lobes largely black; scutellum testaceous; postnotum with the median sclerite yellow, black posteriorly; lateral sclerites nearly surrounded by a U-shaped black mark. Pleura yellow; a conspicuous dark brown area on the mesepisternum and another on the sternum between the fore and middle coxæ; a narrow vertical black line between the mesepisternum and mesepimeron. Halteres brown, the knobs tipped with yellow. Legs with the coxæ brown, the base of the fore coxæ blackened; trochanters reddish yellow; femora brownish yellow, the tips rather narrowly dark brown; tibiae dark brown, the bases paler; tarsi brownish black. Wings greyish subhyaline, the subcostal cell pale brownish yellow; stigma brown; veins dark brown; wing-tip indistinctly darkened; no macrotrichia in the end of cell R_5 . Venation: cell M_1 narrowly sessile.

Abdomen with the first tergite black; remaining tergites orange, narrowly ringed caudally and lined laterally with black, the seventh segment entirely black; hypopygium reddish. Male hypopygium with the lateral lobes of the ninth tergite very narrow and subpointed. Eighth sternite rather deeply notched medially and the surface covered with long yellow bristles.

Hab. West Africa.

Holotype, ♂, Zungeru, Northern Nigeria, November 1910 (*J. W. Scott-Macfie*). B.M. no. 1911. 417.

Type in the collection of the British Museum (Natural History).

Nephrotoma nigeriensis bears a general resemblance to

N. leonia, but is readily told by the coloration of the body and legs, and, especially, by the hypopygium and lack of macrotrichia in the apex of cell R_5 of the wings.

Nephrotoma tigrinoides, sp. n.

Antennæ black, the flagellar segments short; scape orange; frontal tubercle indistinctly bifid; mesonotal præscutum yellow with three distinct black stripes; postnotum glabrous; halteres with the knobs tipped with yellow; wings nearly hyaline; cell *Sc* darker; conspicuous macrotrichia in cell R_5 ; abdomen orange, banded with black.

Male.—Length 10·5 mm.; wing 10·4 mm.

Female.—Length 13 mm.; wing 12·3 mm.

Frontal prolongation of the head orange-yellow; palpi obscure yellow. Antennæ with the scapal segments orange; first flagellar segment pale basally; remainder of flagellum black; intermediate flagellar segments short, the basal enlargement and the apical swelling subequal in size. Head orange; occipital mark small, triangular, dark brown, very distinct; frontal tubercle indistinctly bifid.

Pronotum yellow. Mesonotal præscutum yellow with three shiny black stripes; lateral stripes bent strongly outward; scutal lobes largely black; scutellum testaceous, darker laterally; postnotum yellow, the apical two-fifths black, the surface glabrous. Pleura yellow, variegated with reddish. Halteres brown, the knobs dark brown, about the distal half dull yellow. Legs with the coxæ reddish; trochanters yellow; remainder of the legs brown, the femoral bases yellow. Wings nearly hyaline, the subcostal cell brown; stigma brown; veins brown, those at the wing-base more yellowish; several macrotrichia in the outer end of cell R_5 , these occupying about the outer fourth, along the centre of the cell. Venation: cell M_1 short-petiolate; cell 2nd *A* narrow.

Abdomen with tergite one black, only the caudal and lateral margins narrowly orange-yellow; tergite two orange, the apical quarter black; two small black dots at the second quarter; tergite three orange, the apical third black; tergites four and five orange with a black median area at the caudal margin, smallest on the fifth segment; a black sub-terminal ring occupying segment seven, the caudal half of six, and the basal half of eight; hypopygium orange. The type male has the penis exerted and coiled like a watch-spring.

The female is generally similar, but the abdominal tergites are regularly banded with orange-yellow and black, the caudal margin of segments two to seven being broadly black, the posterior bands scarcely attaining the lateral margins; cell 2nd *A* of the wings longer and wider than in the male.

Hab. Nyasaland.

Holotype, ♂, Mt. Mlanje, May 9, 1913 (*S. A. Neave*).
B.M. no. 1913. 140.

Allotopotype, ♀.

Type in the collection of the British Museum (Natural History).

Nephrotoma tigrina, Alexander (Portuguese East Africa), is generally similar to the present species, but has the frontal tubercle entire; the antennæ very much longer; the wings more suffused with yellow, the wing-tip and *r-m* being strongly infuscated; no macrotrichia in cell *R*₅; cell 2nd *A* longer; details of the coloration of the body slightly different.

Nephrotoma tricincta, sp. n.

Occipital mark not distinct; frontal tubercle indistinctly bifid; mesonotal stripes black; postnotum glabrous, knobs of halteres tipped with yellow; wings greyish yellow, the tip and a cloud at *r-m* brown; a few macrotrichia in the end of cell *R*₅; abdomen orange; a brownish-black sub-terminal ring and two narrow bands at the ends of tergites two and three; eighth sternite sparsely hairy, the margin with a small median tubercle that bears a pencil of hairs.

Male.—Length 15 mm.; wing 14.4 mm.

Frontal prolongation of the head yellow; a shiny brown spot at the base of the nasus; palpi pale brown, the last segment fading into yellowish. Antennæ with the scapal segments yellowish; flagellum broken. Head orange; occipital mark practically lacking, represented only by a slight, ill-defined, pale brown area; frontal tubercle high, very indistinctly bifid.

Mesonotum light yellow, the præscutum with three broad black stripes, the lateral pair bent outward at their anterior ends but not attaining the extreme lateral margin of the sclerites; scutal lobes black; scutellum dark brown; postnotum pale with two large rounded dark brown spots at the posterior margin; surface glabrous. Pleura very pale yellow, indistinctly variegated with reddish. Halteres brown, the extreme apex of the knobs yellowish. Legs with the coxæ and trochanters reddish yellow; femora pale brownish

yellow, broken beyond the basal third. Wings with a greyish-yellow tinge, the subcostal cell more yellowish; wing-tip and a cloud at $r-m$ and the deflection of R_{4+5} infuscated; stigma and veins dark brown; several macrotrichiae in the end of cell R_5 and a very few in cell M_1 . Venation: R s scarcely longer than the deflection of R_{4+5} ; cell M_1 sessile.

Abdomen orange, the first tergite with an irregular blackish spot on either side of the median line; tergites two and three with brownish-black bands at the caudal margin; a conspicuous subterminal black ring that includes tergites six and seven, sternite seven, most of eight, and the apex of six; hypopygium orange. Male hypopygium having the ninth tergite with a broad V-shaped notch, the lateral lobes depressed below the level of the tergite proper, separated by a small circular notch, the outer face with a few black spicules. Eighth sternite pale apically and for a greater distance medially, the posterior median portion produced into a small tubercle that bears a pencil of hairs; sides of the sternite but slightly hairy.

Hab. Nyasaland.

Holotype, ♂, Mt. Mlanje, November 19, 1912 (*S. A. Neave*).

Presented by the Entomological Research Committee, 1913. 394.

Type in the collection of the British Museum (Natural History).

Nephrotoma tricincta is apparently closest to *N. tigrina*, Alexander, but is readily told by the shape and coloration of the occipital mark, the presence of macrotrichiae in cell R_5 , the different abdominal pattern, and other characters.

Nephrotoma livingstonei, sp. n.

Occipital mark not distinct; frontal tubercle low, entire; centre of the median præscutal stripe at the anterior end pale; halteres with the knobs dull yellow; fore femora largely dark brown, posterior femora brownish yellow, rather narrowly tipped with dark brown; wings pale brown, the tip and a narrow seam along the deflection of R_{4+5} infuscated; a few macrotrichiae in cell R_5 ; cell M_1 petiolate; abdomen orange, the basal tergites with a posterior median black mark; a subterminal black band; eighth sternite clothed with long yellow hairs.

Male.—Length about 11.3 mm.; wing 12.5 mm.

Frontal prolongation of the head yellow, more ferruginous

dorsally; palpi pale basally, the distal segments darker. Antennæ rather elongate, if bent backward extending almost to the base of the abdomen; scapal segments orange; first flagellar segment light brown; remaining flagellar segments with the small basal swelling brownish black, the remainder light brown to produce an indistinct bicolorous appearance. Head orange; occipital area elongate-triangular, very pale brown and not at all conspicuous; frontal tubercle rather low, entire.

Pronotum yellow. Mesonotum yellow, the præscutal stripes black, the median stripe split at the anterior end by a pale centre that extends back to about one-fourth the length of the stripe; lateral stripes strongly outcurved, scarcely attaining the lateral margins of the sclerite; scutal lobes largely black; scutellum testaceous, the lateral sclerites almost black; postnotum yellow, on the posterior third with two rather indistinct reddish spots; surface sparsely pubescent. Pleura light yellow, conspicuously marked with reddish. Halteres pale brown, the knobs dark brown, tipped with dull yellow. Legs with the coxæ and trochanters reddish; fore femora dark brown with only the bases yellow; posterior femora brownish yellow, the tips rather narrowly dark brown; remainder of the legs dark brown. Wings with a pale brown suffusion, the subcostal cell more saturated; wing-tip and a seam along the deflection of R_{4+5} very narrowly infuscated; a compact group of about sixteen macrotrichia in the end of cell R_5 . Venation: r at the fork of R_{2+3} ; petiole of cell M_1 from one-half to nearly as long as m ; cell 2nd A rather narrow.

Abdomen orange, the basal third of the first tergite with two confluent black spots; a small semicircular black mark before mid-length of tergite two; a conspicuous black median spot at the caudal margin of tergites two to five, smaller on the posterior segments; a black subterminal ring, including tergites six and seven and sternites seven and eight; hypopygium orange. Male hypopygium with the outer margin of the lateral lobes of the ninth tergite provided with numerous black spines. Outer pleural appendage light yellow, tapering to the long subacute point. Eighth sternite black with the exception of a median caudal portion; lateral hairs long and conspicuous; a small, median, yellow tubercle that bears a few long setæ at its tip.

Hab. Nyasaland.

Holotype, ♂, Blantyre, May 6, 1914 (*Dr. J. B. Davey*).
B.M. no. 1915. 128.

Type in the collection of the British Museum (Natural History).

Nephrotoma marshalli, sp. n.

Antennal flagellum dark brown, the segments relatively short; head orange, the occipital mark large, light brown; frontal tubercle bifid; mesonotal præscutum yellow, the præscutum with three distinct black stripes; wings faintly greyish, the extreme tip darkened; apices of cell R_5 and M_1 with macrotrichia; abdomen orange, the second tergite with two small brown marks near the caudal end; a conspicuous black subterminal ring, including tergites six and seven and sternites six to eight.

Male.—Length 12.3 mm.; wing 14 mm.

Frontal prolongation of the head yellow, more rufous dorsally; nasus long and slender. Antennæ short, if bent backward not extending far beyond the wing-root; the second and third flagellar segments have the basal enlargement and the apical swelling approximately equal in size; first flagellar segment dilated on the distal end, the opposite face bearing two strong bristles; first scapal segment orange; second segment and basal half of the third obscure orange-brown. Head yellowish orange; occipital mark large, light brown, the anterior end not sending a long point on to the frontal tubercle (as in *N. crocea*); frontal tubercle distinctly bifid.

Pronotum yellow. Mesonotal præscutum yellow with three conspicuous black stripes that are not confluent or approximated; lateral stripes bent strongly laterad to the margin of the sclerite; scutum yellow, the lobes largely black; scutellum yellowish testaceous, the lateral sclerites almost black; postnotum light yellow, on the posterior third with two large, circular, blackened areas; lateral sclerites light yellow and reddish brown. Pleura light yellow, variegated with reddish. Halteres dark brown, the knobs light yellow. Legs with the coxæ pale reddish; trochanters reddish yellow; femora brown, the tips brownish black; tibiae and tarsi almost black. Wings with a faint greyish tinge, the costal cell faintly, the subcostal cell strongly, yellowish; stigma dark brown; extreme tip of wing darkened; veins dark brown; a few macrotrichia in the apices of cells R_5 and M_1 . Venation: cell M_1 short-petiolate to narrowly sessile.

Abdomen with the first tergite orange, about the basal half brown; tergite two orange with two paired brown dots

near the caudal margin; tergites three to five dull orange; six and seven black; eight and nine orange; sternites orange, segments six and seven and the basal half of eight black. Male hypopygium with the ninth tergite about as in *N. unicingulata*, but the lateral angles not so pronounced; eighth sternite notched medially, fringed on either side with conspicuous yellow hairs.

Hab. Natal.

Holotype, ♂, Ulundi, altitude 5000–6500 feet, September 1896 (*G. A. K. Marshall*). B.M. no. 1903. 17.

Type in the collection of the British Museum (Natural History).

Nephrotoma marshalli agrees with *N. crocea* (Loew) in its bifid frontal tubercle, but differs in the short antennæ, the differently shaped occipital mark, and the details of coloration. It agrees well with *N. unicingulata*, Alexander, in the coloration of the abdomen and the macrotrichia of the wing, but differs in the structure of the frontal tubercle and the details of coloration and structure. This interesting crane-fly is respectfully dedicated to its collector, Dr. Guy A. K. Marshall.

VIII.—*Some new Insular Squirrels of the Callosciurus caniceps-concolor Group from Peninsular Siam.* By
OLDFIELD THOMAS and HERBERT C. ROBINSON.

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THE following new forms of Squirrel come from various small islands off the west coast of Peninsular Siam, between 9° and 6° N. latitude, the majority being from islets near Salanga (= Junk-Ceylon), 8° N.

In describing them we are confronted with the difficulties every one has met in dealing with plastic island forms of various degrees of specialization, and the question as to what forms should have binomial and what trinomial is one that we have had great hesitation in deciding.

On the whole, in this group, we have come to the conclusion that the relationships of the different forms will be most easily understood if they are attached to what appear to be their parent continental species, and that of these it is advisable to recognize three, namely:—

C. caniceps, from north of about 13°, with yellow seasonally